

Claims

[c1] We claim:

1. A brake system having a boost unit that is secured to a panel of a vehicle that separates an engine compartment from a passenger compartment, said boost unit having a housing that retains a valve body with a cylindrical projection that extends through a first opening in said housing into the passenger compartment, a boot located on said panel that extends from said opening and is secured to an input rod, a valve located within a bore of said valve body and responsive to an input force applied to the input rod to selectively communicate air from said engine compartment to a chamber in said boost unit by way of said bore for creating a pressure differential across a movable wall in the boost unit, said pressure differential acting on said movable wall to develop an output force to effect a brake application, said brake system being characterized by a spacer located between said panel and said boost unit for off-setting said boost unit from said panel into said engine compartment; said spacer being defined by a body having a front face and a rear face created by a first side, a second side, a top side, and a bottom side, said body having

a plurality of circular bearing surfaces located at an intersection of said sides with an axial bore that extends through each bearing surface for receiving a mounting bolt that extends from said boost unit; and a wall located adjacent said front face that extends between said first side, said second side, said top side and said bottom side, said wall having a second axial opening with a flange that extends to a height that is parallel with said front face and a plurality of ribs that extend from said flange toward said sides to define a plurality of radial slots, said body having an axial slot that extend from said front face to said rear face and a peripheral slot adjacent said rear wall through which said axial slot is connected to said engine compartment, said boot being defined by a base member that is joined to an end member by an accordion shaped body, said accordion shaped body surrounding said cylindrical projection of said valve body while said input rod extends through and is sealed with respect to said end member, said base member engaging said front face of said spacer and being compressed by said first side, second side, said top side and said bottom side of said spacer body when fasteners are connected to the mounting bolts such that unrestricted communication of air from the engine compartment to said bore of said valve body occurs along a flow path defined by said peripheral slot, axial slot, plurality of radial

slots in the spacer and an axial space between said accordion shaped body of said boot and said cylindrical projection of said valve body.

- [c2] 2. The brake system as recited in claim 1 wherein said plurality of radial ribs prevent said base member of said boot from engaging said wall to assure that said flow path remains substantially a same size during the communication air from the engine compartment to said bore of said valve body.
- [c3] 3. The brake system as recited in claim 1 wherein at least one of said bearing surfaces of said spacer is characterized by a plurality of tabs that are located in said axial bore thereof, said plurality of tabs being directed toward the axis of the axial bore and said front face such that on engaging a mounting studs on said boost unit said tabs radially flex outwardly and only thereafter allow said rear face of said spacer to be moved into engagement with said housing of said boost unit to assure that said front face is adjacent said base member of said boot in the establishment of said flow path.
- [c4] 4. The brake system as recited in claim 1 wherein a plurality of said plurality of said bearing surfaces of said spacer are characterized by a plurality of tabs that are located in said axial bore thereof, said plurality of tabs

being directed toward the axis of said axial bore and said front face such that on engaging a corresponding mounting stud on said boost unit said tabs radially flex outwardly and only thereafter allow said rear face of said spacer to be moved into engagement with said housing of said boost unit to assure that said front face is adjacent said base member of said boot in the establishment of said flow path.

- [c5] 5. The brake system as recited in claim 4 wherein each of said plurality of tabs are located in an axial bore at a point that is mid-way between said front face and said rear face and in flexing outwardly never extend past said front face so as to engage said base member of said boot.
- [c6] 6. The brake system as recited in claim 5 wherein said engagement of said plurality of tabs with a corresponding mounting stud retain said spacer on said boost unit prior to the attachment of said fasteners on said mounting studs.
- [c7] 7. The brake system as recited in claim 6 wherein said peripheral slot in said bottom side of said spacer allows any water that may be present in said spacer to be communicated to said engine compartment area rather than effect the flow of air through the flow path.

- [c8] 8. The brake system as recited in claim 7 wherein said first side, said second side and said top side are each characterized by parallel walls with successive rectangular openings to provide support for retaining said boost unit on said panel when said fasteners are attached to said mounting studs.
- [c9] 9. The brake system as recited in claim 8 wherein said bottom side is arcuate such that said peripheral slot has a point that is lower than the first and second sides of said body of said spacer.
- [c10] 10. The brake system as recited in claim 9 wherein said plurality of radial ribs prevent said base member of said boot from engaging said wall to assure said flow path remains a substantially same size during the communication of air from the engine compartment to said bore of said valve body.